# ON THE FAMILY CUPEDIDAE, COLEOPTERA

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## Abstract

This paper includes descriptions and figures of all known species from Australia. *Cupes varians* Lea was found to be incorrectly placed in the genus *Omma* by some authors. Three species are described as new—*Cupes youanga*, *C. mathesonae* and *C. eumana*. Thus the total number of species in Australia is increased to 6 of which 4 are placed in the genus *Cupes*, and 2 in the genus *Omma*. A new genus, *Prolixocupes* is erected to include S. American species *latreillei* (Solier), which is segregated from the genus *Cupes*.

## Introduction

In the past, only an occasional publication has dealt with members of the family Cupedidae in Australia. Because of the discovery of some undescribed forms, the study of all Australian species became advisable. This paper includes descriptions and figures of all Australian species, and segregates S. American species *latreillei* (Solier) into a separate genus distinct from *Cupes*.

The position of the family has been in doubt for a long time, and lengthy discussions have been published by many authors (Fowler 1912; Gauglebauer 1903; Kolbe 1901, 1908; Peyerimhoff 1902a, b, 1909; Sharp and Muir 1912; and others). Finally it was placed in a separate suborder, the Archostemata, together with the entirely N. American family Micromalthidae (Kolbe 1908, Forbes 1926, Crawson 1955, Atkins 1958). As a family having primitive characteristics, and according to its relationships, morphological features and larvae (Böving and Craighead 1930), the suborder Archostemata appears to be the most correct position. After Janssens (1953), the family contained 22 species which were placed in 5 genera. For Australia only 3 species were listed, all in the genus *Omma*, irrespective of the fact that one of them, *varians* Lea (1902), was originally described in the genus *Cupes*. The changed taxonomic position is discussed below. As dissection for genitalia was not undertaken, and secondary sexual characters are absent, sex was not determined in the specimens examined.

Recent species are known from N. and S. America, SE. Asia, E. Australia, and SE. Africa, whereas fossil forms indicate wider distribution in previous geological times.

A number of institutions and private collectors have made available their material for this study, and they are listed under the following abbreviations:

| | |
|---|---|
| AM | Australian Museum, Sydney. |
| BPM | Private collection of Dr. B. P. Moore, Melbourne. |
| CSIRO | Division of Entomology Museum, CSIRO, Canberra. |
| ETS | Private collection of Mr. E. T. Smith, Sunshine. |
| FEW | Private collection of Mr. F. E. Wilson, Malvern. |
| FH | Private collection of Mr. F. Hallgarten, Pascoe Vale. |
| MACL | Macleay Museum, Sydney. |
| NM | National Museum of Victoria, Melbourne. |
| QM | Queensland Museum, Brisbane. |
| QU | Queensland University, Department of Entomology, Brisbane. |
| SAM | South Australian Museum, Adelaide. |

## Family Cupedidae

*Cupesides* Lacordaire, 1857. *Hist. Nat. Ins. Gen. Col.* 4: 505.

*Cupedidae* Alluaud, 1900. *Col. Reg. Malgache.*: 155.
*Ommadidae* Sharp and Muir, 1912. *Trans. Ent. Soc. Lond.* 1912: 521.

Elongate insects of medium size, somewhat flattened. Elytra deeply sculptured with odd intervals strongly elevated; striae with large and deep impressions, separated by transverse ribs. Head more or less porrected; eyes round and prominent; antennae 11-segmented, filiform or serrate. Prothorax small, noto-pleural sutures distinct. Metasternum with distinct transverse suture along the posterior margin. Abdomen with 5 visible sternites. Legs short and slender; tarsi 5-segmented; claws small, simple.

The Australian genus *Omma* Newman was considered by Sharp and Muir (1912) to form a distinct family Ommadidae, separate from the family Cupedidae. The separation was based on differently formed aedeagus but, at the same time, the authors themselves admitted that 'we really, however, know very little about the creatures and generalisation is premature'. As the separation of the new family is based on a single feature of the one sex, we can agree with the opinion of Atkins (1958) that 'it is improbable, however, that one can arrive at a true expression of the phylogenetic relationship on the basis of one or two features'. Genus *Omma* is therefore retained in the family Cupedidae. Described by Newman (1839), it consisted of a single species, *Omma stanleyi*, from Queensland. Later, Macleay (1871) added his species *mastersi* to this genus and finally, Lea (1902) described a third species, *varians*, which he placed in the genus *Cupes*. Authors often have referred to the peculiar characters of *Omma stanleyi* but have neglected the study of the other Australian species. Gestro (1910) and Janssens (1953) in the 1st and 2nd edition respectively of Coleopterorum Catalogus Part 5, entered *varians* under the genus *Omma*. No literary references to discussion and justification of this transfer are known. It is obvious that *varians* does not belong to *Omma*, and, in addition, it has been found by the present author to be generically distinct from *Cupes latreillei* Solier of S. America. The latter species was fully discussed and figured by Monrós and Monrós (1952). It was necessary, therefore, to compare both species, *varians* and *latreillei*, with the type species *Cupes capitatus* Fabricius. Having done so, the author concluded that the generic characters of *capitatus* are found in the Australian species *varians* while, in the S. American species *latreillei*, characters warranting the erection of a new genus are present.

Key for separating genera discussed in this paper:

1. Prosternum with deep tarsal grooves; antennae long, reaching beyond base of prothorax .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. 2
   Prosternum without tarsal grooves; antennae short, not reaching beyond base of prothorax .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. *Omma* Newman
2. Gula wide, reaching posterior ridge of head; genae separated ventrally . *Cupes* Fabricius
   Gula narrow, not reaching posterior ridge of head; genae meeting ventrally *Prolixocupes* gen. nov.

## Genus **Cupes** Fabricius

*Cupes* Fabricius, 1801. *Syst. El.* 2: 66.

Type species: *Cupes capitatus* Fabricius, 1801 (by monotypy).

Head short and wide, widest anteriorly, angles rounded; with elevated projections above the base of antennae, the latter filiform; gula short and wide, somewhat rectangular, reaching posterior ridge of head; genae widely separated by gula along entire distance. Prosternum with deep tarsal grooves along lateral and anterior margins, separated anteriorly by narrow single or double ridge. Only tarsal segments and distal ends of tibiae of anterior legs capable of retraction into the respective grooves.

Tarsal grooves of *capitatus* separated anteriorly by two parallel ridges (Pl. IV,

fig. 1), but in all known Australian species as well as in another N. American species, *Cupes concolor* Westwood, which was available for examination, grooves were separated by single ridge (Pl. IV, fig. 2; Pl. V, figs. 4, 5).

The genus is distributed from N. America to E. and S. Asia, SE. Africa, and E. Australia.

Key for separating Australian species of genus *Cupes*:

1. Head with round, forward-pointing projection above each eye .. .. .. *varians* Lea
   Head without such projection, at most with slight elevation .. .. .. .. .. .. .. 2
2. Scales on dorsal surface black and greyish-white .. .. .. .. .. .. *cumana* sp. nov.
   Scales on dorsal surface dark brown and yellowish .. .. .. .. .. .. .. .. .. .. 3
3. Anterior end of 3rd interval covered with yellowish scales .. .. .. *youanga* sp. nov.
   Anterior end of 3rd interval covered with dark brown scales .. .. *mathesonae* sp. nov.

## Cupes varians Lea

(Fig. 3; Pl. IV, fig. 2)

*Cupes varians* Lea, 1902. *Proc. Linn. Soc. N.S.W.* 26: 485, 513 (type, not paratypes).
*Omma varians* Gestro, 1910. *Col. Cat.* 4 (5): 2.
*Omma varians* Janssens, 1953. *Col. Cat.* 4 (5): 4 (Second edition).
*Cupes varians* Atkins, 1958. *Can. Ent.* 90: 535.

At the time of description, Lea had 4 specimens available for study. The largest one was designated as the type, and is the only specimen which represents the species; the 2nd and 3rd specimens (Lea 1902, p. 487), however, are *youanga*; the 4th is *cumana*. This was established by examination of all 4 specimens in the Macleay Museum.

*C. varians* is the largest Australian species of this genus and, although variable in size, it is easily separable from the other 3 by the rounded, forward-pointing projection above the eyes. Its general appearance is often altered considerably by abrasion or staining of scales.

Head wide, angles rounded, median line distinct; cuneiform projections above the base of antennae; above each eye, behind the cuneiform projections, there is another round, forward-pointing projection.

Prothorax transverse, apex narrow, suddenly widened to sides, these slightly rounded and bidentate near anterior angles; dorsal surface deeply depressed on either side of central keel-like ridge, the latter with narrow median line, and with small impressions on either side near anterior margin. Scales on head and prothorax mostly elliptical, yellowish-brown, denser in some parts than in others; integument visible between scales in most places. Scales on 1st 3 antennal segments as on the head, but progressively becoming thinner, somewhat spine-like on 5th segment, and absent from 6th and subsequent segments; 3rd to 11th segments densely covered with curved brownish setae. Tarsal grooves separated by narrow longitudinal ridge; anterior margin of prosternum narrow and only slightly raised (Pl. IV, fig. 2). Scales on scutellum yellowish-brown. Elytra with odd intervals raised, and covered with scales, dark brown and yellowish-brown in longitudinal sections. Wing venation as in Fig. 3.

Length 10-14·5 mm., width 3-4·5 mm.
Type locality—Sydney, N.S.W.
Type location—MACL.
Specimens examined—28 (AM, BPM, ETS, FEW, FH, MACL, NM, QM, QU, SAM).

Distribution—Queensland: Mt. Tamborine, National Park. New South Wales: Dorrigo, Barrington Tops, Sydney. Victoria: Lorne, Fish Creek, Mt. Buller, Mill-

grove, Belgrave, Mt. Donna Buang, Mitcham. Tasmania: Sheffield (Lea 1902, p. 513).

**Cupes youanga** sp. nov.

(Fig. 4; Pl. V, fig. 4)

Smaller than *varians*, of similar general coloration, but differing in detail.

Head densely covered with pale yellowish-brown scales, intermixed with occasional dark brown; integument not visible between scales. Cuneiform projections above base of antennae present, but with only a slight elevation above each eye. Antennae covered with yellowish-brown scales becoming progressively sparser towards apex; apical 2 or 3 segments with setae only; setae intermixed with scales on the basal segments, except 1st and 2nd, where absent.

Prothorax slightly wider than long, apex narrow, suddenly widened to rounded sides, small acute point near the apical angles; dorsal surface depressed on either side of central ridge, the latter covered with dark brown scales, and rest of prothorax, including median line, with dull yellowish-brown scales. Tarsal grooves separated by narrow longitudinal ridge; anterior margin of prosternum high, ridge-like, and nearly as wide as groove (Pl. V, fig. 4).

Scales on scutellum mainly dark brown. Elytra with 3rd interval at anterior end covered with pale yellowish-brown scales for a short section, which then followed by a section of dark brown scales. This character helps to separate this species from *mathesonae*. Wing venation as in Fig. 4.

Length 6-8 mm., width 1·7-2·1 mm.

Type material—Type: Emerald, Vic., C. Oke (NM); 8 paratypes: Eukey, Q., Jan. 1934, F. E. Wilson (FEW); Blue Mts., N.S.W., Jan. 1905, H.J.C. (QM); Sydney, N.S.W., Dec. 1902, H.J.C. (NM); Merrijig, Vic., 15 Feb. 1958, I. Edwards (NM); Mt. Timbertop, Vic., Jan. 1959, I. Edwards (FEW); 'Victoria' (NM); Wentworth Falls, N.S.W. (SAM); 'Australia', French (SAM).

Other specimens examined—2 paratypes of *C. varians* Lea + 1, Sydney, N.S.W. (MACL).

Distribution—S. Queensland, New South Wales, Victoria.

The trivial name 'youanga', meaning 'another', is derived from an aboriginal word used by the natives of the Yarra Yarra tribe in Victoria.

**Cupes mathesonae** sp. nov.

(Fig. 7; Pl. V, fig. 5)

Very similar to *youanga*, but slightly larger, and differing in a number of minute characters.

Head densely covered with pale yellowish-brown scales, intermixed with dark brown scales, which are more pronounced and darker than in *youanga*; integument not visible between scales. Cuneiform projections above base of antennae present; elevations above eyes absent. Antennae covered with yellowish-brown, irregularly intermixed with dark brown scales, progressively becoming sparser towards apex, setae on all but two basal segments.

Prothorax slightly wider than long, apex narrow, suddenly widened to rounded sides, point near apex acute; dorsal surface depressed on either side of central ridge, widely covered with dark brown scales along middle, but with pale yellowish-brown scales on sides. Tarsal grooves separated by narrow longitudinal ridge, latter followed dorsally by distinct depression; anterior margin of prosternum high, ridge-like, and almost as wide as groove (Pl. V, fig. 5).

Scales on scutellum dark brown, occasionally with a few paler ones along middle. Elytra with 3rd interval at anterior end covered for some distance with dark brown scales, followed by section of pale yellowish-brown ones. Wing venation as in Fig. 7.

Length 7-10 mm., width 1·9-2·6 mm.

Type material—Type: Warburton, Vic., Jan. 1930, C. Oke (NM); 10 paratypes: Ararat, Vic., E. T. Smith (ETS); 'Victoria' (CSIRO); Pascoe Vale, Vic., 9 Dec. 1955, F. Hallgarten (NM); Pascoe Vale, Vic., 20 Dec. 1954, F. Hallgarten (FH); 3 specimens Pascoe Vale, Vic., 15 Jan. 1957, F. Hallgarten (FH); St. Kilda, Vic., 6 Jan. 1920, C. Oke (NM); Windsor, Vic., 15 Feb. 1920, Kershaw (NM); North Fitzroy, Vic., 15 Jan. 1953, F. Hallgarten (FH).

Distribution—Victoria.

Named after Miss E. M. Matheson, National Museum of Victoria, whose interest, assistance and criticism have greatly facilitated completion of this work.

### **Cupes eumana** sp. nov.

(Fig. 5)

Species similar in size to *youanga* and *mathesonae*, but scales are black and greyish-white instead of brown and yellowish-brown.

Head densely covered with scales, black on dorsal surface, greyish-white, intermixed with black on sides; integument not visible between scales. Cuneiform projections above base of antennae present, elevations above eyes absent. Antennae covered with black and greyish scales, somewhat thinner towards apex, setae present on all except 1st segment, those on basal segments widened and somewhat scale-like, becoming narrower towards apex.

Prothorax wider than long, apex narrow, widened to evenly rounded sides; short acute point on each side close to apical angles; dorsal surface depressed on either side of central ridge, latter covered with black scales, rest of prothorax with greyish-white scales. Tarsal grooves separated by narrow longitudinal ridge; anterior margin of prosternum high, ridge-like, about as wide as the groove.

Scutellum covered with black scales. Elytra with intervals covered with black and greyish-white scales in sections. Wing venation as in Fig. 5.

Length 6·5-7 mm., width 1·8 mm.

Type material—Type: Merrijig, Vic., 15 Feb. 1958, A. Neboiss (NM); Paratype: Halls Gap, Vic., 30 Mar. 1958, H. Borch (FH).

Other specimens examined—The 4th specimen (paratype) of Lea's *C. varians* (MACL), mounted on one card with 2 specimens of *youanga*.

Distribution—New South Wales, Victoria.

The trivial name 'eumana', meaning 'dormant, sleeping', is derived from an aboriginal word used by the natives in Victoria.

### Genus **Prolixocupes** gen. nov.

Type species: *Cupes latreillei Solier* (1849).

Although similar to genus *Cupes*, it is separated by proportionally longer head and prothorax in relation to elytra, latter being less than 2·5 times longer than head and prothorax together.

Head distinctly longer than wide with deep median cleft; antennae serrate; gula narrow, somewhat triangular, not reaching posterior ridge of head; genae meeting in section between gula and posterior ridge; antennal grooves absent, antennae serrate. Prosternum with tarsal grooves along lateral margins, widely

separated anteriorly (Pl. IV, fig. 3).

On present evidence this monotypic genus is confined to Chile and Argentina.

**Prolixocupes latreillei** (Solier) comb. nov.

(Fig. 2; Pl. IV, fig. 3)

*Cupes latreillei* Solier in Gay, 1849. *Hist. Chil.* 4: 466.
*Cupes latreillei* Gestro, 1910. *Col. Cat.* 4 (5): 1.
*Cupes latreillei* Monrós and Monrós, 1952. *An. Soc. cient. Argent.* 154: 19-41.
*Cupes latreillei* Janssens, 1953. *Col. Cat.* 4 (5): 3 (second edition).

A detailed description and figures of the species are given by Monrós and Monrós (1952). Their figure 26 on p. 30 of the wing venation appears in some way incomplete, and requires a few remarks. All characters of the specimen of *latreillei* available for the present study from the Curtis collection in the National Museum of Victoria, agree fully with the given description, except those of wing venation (Fig. 2). The radial sector and median veins do not end blindly, but are connected with the brachial cell and the oblong cell respectively. The brachial cell is complete and formed by 2 radial cross veins, but the oblong cell takes a more vertical position.

Genus **Omma** Newman

*Omma* Newman, 1839. *Ann. Nat. Hist.* 3: 303.
*Omma* Peyerimhoff, 1902. *Bull. Soc. ent. Fr.* 1902: 330.
*Omma* Sharp and Muir, 1912. *Trans. Ent. Soc. Lond.* 1912: 521, 615, 632.
*Omma* Atkins, 1958. *Canad. Ent.* 90: 532.

Type species: *Omma stanleyi* Newman 1839 (by monotypy).

Head protruding, longer than wide, suddenly narrowed behind eyes, forming a distinct neck; antennae 11-segmented, short, filiform, not reaching posterior angles of prothorax, 1st segment long, 2nd shorter, 3rd longer than 1st and 2nd together, succeeding ones small; mandibles large, curved, tridentate at apex. Surface of head and prothorax granulate, covered with hairs or scales. Prothorax quadrate, anterior and posterior angles rounded; prosternum without tarsal grooves. Elytra about twice as wide as prothorax; covered with hairs or scales. Legs moderately long, tarsi 5-segmented.

Endemic Australian genus, known distribution limited to the E. part of the continent.

Key to species of the genus *Omma*:

1. Body covered with yellowish hairs, elytra concolorous .. .. .. .. .. *stanleyi* Newman
   Body covered with black and white scales, elytra black with white ornamentation *mastersi* Macleay

**Omma stanleyi** Newman

(Fig. 6; Pl. V, fig. 6)

*Omma stanleyi* Newman, 1839. *Ann. Nat. Hist.* 3: 304.
*Omma stanleyi* Peyerimhoff, 1902. *Bull. Soc. ent. Fr.* 1902: 330.
*Omma stanleyi* Sharp and Muir, 1912. *Trans. Ent. Soc. Lond.* 1912: 521, Pl. 59, figs. 102, 102a (♂ genitalia).

Dull, concolorous brownish-black to black species; head and prothorax densely granulated, elytra with separate granules on intervals; covered with yellowish hairs. Head longer than wide, eyes prominent. Prothorax with round depressions near anterior angles, and long transverse depression along posterior margin. Semi-circular depression along anterior margin of prosternum. Elytra about twice as long as wide, rounded at apex. Wing venation as in Fig. 6.

Length 13-25 mm., width 4·5-9 mm. (widest part of elytra).

Type locality—'Australia'.

Type location—unknown.

Specimens examined—69 (AM, CSIRO, ETS, FEW, MACL, NM, QM, QU, SAM).

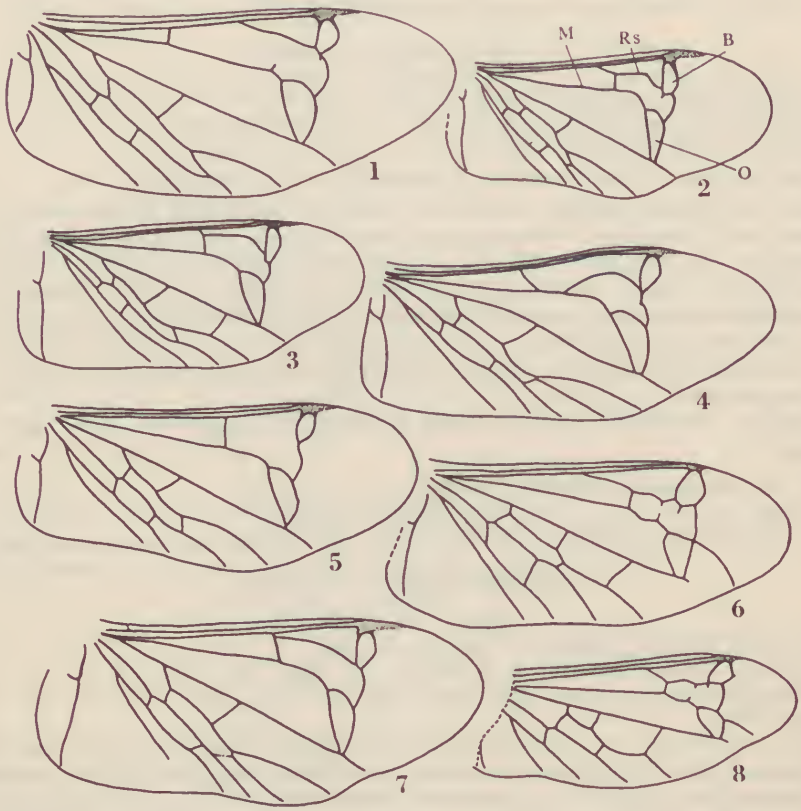
Distribution—Queensland: Warwick, Clermont, Gayndah, Yandilla, Dalby, Lawes, Rockhampton, Ipswich, Gatton, Jandowae, Toowoomba. New South Wales: Rope's Creek, Muswellbrook, Penrith. Victoria: Macedon, Inglewood, Ballarat, Chiltern. South Australia: Nuriootpa.

### **Omma mastersi** Macleay

(Fig. 8)

*Omma mastersi* Macleay, 1871. *Trans. ent. Soc. N.S.W.* 2: 169.

This species, in shape, closely resembles *stanleyi*, but is easily separated by white scales on head and elytra.




Figs. 1-8.—Wing venation: 1. *Cupes capitatus* Fab. 2. *Prolixocupes latreillei* (Sol.) Rs—radial sector, M—median, B—brachial cell, O—oblong cell. 3. *Cupes varians* Lea. 4. *Cupes youanga* sp. nov. 5. *Cupes eumana* sp. nov. 6. *Omma stanleyi* Newm. 7. *Cupes mathesonae* sp. nov. 8. *Omma mastersi* Macl. (Not to scale.)

Integument of head and prothorax granulated, black, but partly hidden under scales, which are white on head and along posterior margin of prothorax, remaining ones being black. A pair of round depressions near anterior margin of prothorax.

Scutellum covered with white scales. Elytra black, with white scales which form distinct pattern of an oblique transverse band at middle of elytra and also cover costa, 2nd interval and apical 3rd of suture. Wing venation as in Fig. 8.

Antennae, legs and ventral surface sparsely covered with white scales.

A specimen in the Australian Museum collection labelled '*Omma mastersi* Macl. Gayndah, Qld.' in Master's handwriting, and with a red holotype label, does not agree with the original description, and is identified as a small specimen of *Omma stanleyi*. It is certain that this specimen has not been used for the specific description, as it is considerably larger and lacks the typical scales. It is not known what happened to the actual type and why the identification label was attached to this specimen. At present the location of the type specimen is unknown.

The above description of the species was prepared, and wing venation drawn, from a specimen in the South Australian Museum, collected at Toowoomba, Q. This specimen was compared with the original description, and found to agree in every detail.

Length 7-11 mm., width 2·3-4 mm.

Type locality—Gayndah, Q.

Type location—(could not be located in AM).

Specimens examined—7 (NM, QM, SAM).

Distribution—Queensland: Gayndah, Toowoomba, Wyreema, Brisbane. New South Wales: Narromine.

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## Explanation of Plates

(Photographs by the author)

The photographs illustrating this article are stereo pairs. Structures of the specimens will stand out more clearly when viewed under a stereoscope. Numbers apply to each pair.

PLATE IV

Fig. 1.—*Cupes capitatus* Fab. ex Curtis collection (NM).
Fig. 2.—*Cupes varians* Lea 'Victoria' (NM).
Fig. 3.—*Prolixocupes latercillei* (Sol.) ex Curtis collection (NM).

PLATE V

Fig. 4.—*Cupes youanga* sp. nov. Paratype, Sydney, N.S.W. (NM).
Fig. 5.—*Cupes mathesonae* sp. nov. Paratype, Pascoe Vale, Vic. (NM).
Fig. 6.—*Omma stanleyi* Newman, 'Queensland' (NM).